

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional)

SUN040475

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on September 7, 2010Signature /Laura S. Mellblom/Typed or printed name Laura S. Mellblom

Application Number

10821468

Filed

04/09/2004

First Named Inventor

NEDIM FRESKO

Art Unit

2165

Examiner

MICHAEL J. HICKS

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

I am the

- ☐ applicant/inventor.
- ☐ assignee of record of the entire interest.
See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.
(Form PTO/SB/96)

☒ attorney or agent of record.
Registration number 44,866

☐ attorney or agent acting under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

/Kent A. Lembke/

Signature

Kent A. Lembke

Typed or printed name

720-562-5507

Telephone number

September 7, 2010

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☒ *Total of 1 forms are submitted.

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

Nedim Fresko

Serial No.: 10/821,468

Filed: April 9, 2004

Confirmation No.: 1088

Atty. File No.: SUN040475

For: "SELECTIVE PROMOTION
POLICY FOR GENERATIONAL
GARBAGE COLLECTORS"

) Group Art Unit: 2165

) Examiner: Neveen Abel-Jalil

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SUBMISSION OF NOTICE OF APPEAL
AND PRE-APPEAL BRIEF REQUEST
FOR REVIEW

MAIL STOP: AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Office Action of June 16, 2010, please consider the attached Notice of Appeal and Pre-Appeal Brief Request for Review. Submitted herewith is the fee for filing the Notice of Appeal. Please credit any overpayment or charge any underpayment to Deposit Account No. 50-1419.

Remarks in support of the Pre-Appeal Brief Request for Review begin on page 2 of this paper. As a brief summary, though, the Examiner, in the June 16, 2010 Office Action, withdrew a prior anticipation rejection based on U.S. Pat. Appl. Publ. No. 2001/0044856 ("Agesen"), which Applicant argued failed to show use of two or more policies for promoting longer-lived objects to support generational garbage collection. The Examiner, however, now cites U.S. Pat. No. 6,490,599 ("Kolodner"). Kolodner also fails to show or suggest use of two or more promotion policies or that such a policy determination is made at object allocation (i.e., Kolodner is missing claims elements).

REMARKS

Claims 1-10, 12-27, and 29-33 are pending for consideration by the Examiner.

Rejections of Claims under 35 U.S.C. §102

Claims 1-10, 12-27 and 29-33 were rejected under 35 U.S.C. §102(b) as being anticipated by Kolodner. The Examiner has cited this reference in error because the reference is missing one or more key elements of each of the independent claims. The following discussion begins with an overview of Kolodner's teaching and then Applicants' teaching prior to proceeding to particular claim language. The discussion of claims begins with independent claim 32, and the discussion of Kolodner's and Applicant's teachings clearly shows why the Examiner has made clear errors in his use of Kolodner to reject this claim.

Kolodner's Background clarifies that its teaching is generally toward on-the-fly garbage collectors of the mark and sweep type. In prior versions of such collectors, a mark or track is done of live objects with a 3-color scheme (white if they have not been traced, gray if they have been traced but children have yet to be traced, and black if traced and children traced as well). At col. 4, line 15, it is noted that after the mark phase is completed all live objects are colored black. Then, the sweep phase is performed to reclaim all white objects (and re-color black objects white). The Office Action cites col. 10 of Kolodner, but in this column, Kolodner teaches that the above mark and sweep type collector can be improved upon by also including another color (i.e., yellow) that is used to mark new objects. A yellow color "has the following meaning: It's a black for tracing (and sweeping) purposes but it's not in the old generation" (see col. 10, lines 47-52).

Significantly, the sweep and phase aspects of such garbage collectors only address or teach which objects should be reclaimed and provide no teaching regarding promotion/aging policies for objects allocated to a memory heap (e.g., to a young generation portion of the heap). Yellow is used to avoid having an infant/new object reclaimed or placed directly in the older generation, but it is not being used as an indicator which one of two or more promotion policies is to be applied to the object. Instead, col. 12, lines 25-46 of Kolodner teach a single policy that is used for its

generational garbage collector. Stated simply this single policy is "an aging mechanism which enables to promote objects [sic] from a younger generation to an older generation after n collection cycles." This policy is used for every object in Kolodner.

Applicants teach a very different technique for improving efficiency of memory allocation. Specifically, in Applicants' Summary in paras. [0010] and [0011], it is explained that conventional garbage collectors "promote all objects in the Young Generation in accordance with a single policy" (as was also taught by Kolodner as noted above with the coloring techniques used to handle mark and sweep aspects), and, unfortunately, this results in "premature promotion of some objects that become garbage after they have been moved to the next generation." In para. [0011], Applicants indicate that there are several drawbacks to promoting objects to the older generation. Such promotion is more expensive to garbage collect, and it may result in unnecessary use of the space reserved for the older generations. Kolodner does not differentiate among its objects with regard to application of its aging mechanism (e.g., no discussion that the "n" parameter could/should be varied for differing ones of the objects to avoid premature promotion).

As discussed in paras. [0013] to [0015], Applicants teach that premature promotion can be avoided by using information about an object to determine if the object should be assigned a normal/conventional promotion policy or a different promotion policy that delays (or even prevents) promotion for that object to an older generation. Note, such assigning of the promotion policy is chosen upon allocation to the young generation portion of the heap/memory (such as by using the general memory allocator or a preemptive memory allocator). In Applicants' approach, a determination is made as to which objects are more likely to be or quickly become garbage (e.g., don't want to promote an object that may live 5 cycles when the promotion threshold for the garbage collection counter is 4 cycles as this is inefficient).

Claim 32 calls for the objects allocated to the Young Generation to be promoted after placement in the Young Generation based on differing promotion policies, and Kolodner does not discuss application of differing aging mechanisms or other promotion policies to objects after they are placed into the heap. The addition of a new color for use in trace and sweep operations does not teach using two or more promotion policies

(e.g., all new/infant objects are yellow – so, two or more policies are not applied but only the single aging mechanism discussed). Clearly, Kolodner does not show that some objects should have their tenure in the Young Generation extended or be longer than normal (as defined by "n" in its aging mechanism). For this reason, claim 32 is not anticipated by Kolodner.

Further, claim 32 calls for code for promoting live ones of the objects allocated in the Young Generation to the Older Generation including first determining which promotion policy had been assigned to the object and then applying this promotion policy. As noted above, Kolodner fails to teach or suggest differing promotion policies but only discusses use of the aging mechanism to handle promoting young objects to older generations. For this additional reason, claim 32 is not anticipated by Kolodner.

Claim 33 depends from claim 32 and is believed allowable over Agesen for at least the reasons provided for allowing claim 32 over this reference. Further, claim 33 calls specifically for the first promotion policy to assign a value to a garbage collection count and for the second promotion policy to involve assigning a pre-emptive count value to the object that defines the longer tenure for the object in the Young Generation. Kolodner does not teach assigning a pre-emptive count value to any of its objects, and this is due, in part, to the fact that this reference does not define longer tenures for a subset of its objects. Hence, claim 33 is not anticipated for this reason.

As amended, claim 1 includes limitation similar to those found in claim 32 but in method form. Hence, the reasons for allowing claim 32 are applicable to claim 1.

Further, claim 1 requires that an indication be provided in the header of the object to identify to a promotion method when the first (or normal) promotion policy is preempted (see, for example, the preemption indicator 212 or 222 in Figures 2C and 2D of Applicants' specification and their use in step 404 of method 400 of Figure 4). The Office Action fails to provide any mention or discussion of the limitation of claim 1 that "the indication used during a promoting step to preempt use of the first promotion policy" nor does it indicate where Kolodner is believed to provide such teaching. Applicants could find no case where the aging mechanism is preempted – let alone based on an indication in its header. Hence, Kolodner fails to show the method of claim 1 for this additional reason.

Independent claim 15 as amended includes limitations similar to those found in claim 32 and is believed allowable over Kolodner at least for the reasons provided for allowing claim 32. Further, claim 15 includes a limitation that the second promotion policy (which causes a delay or cancellation of the promoting of an object) is assigned when the objects are allocated by system code or are associated with operations that are known or defined as likely to generate garbage. Kolodner fails to discuss handling objects allocated by system code or with operations likely to generate garbage differently (e.g., all objects appear to be treated similarly in Kolodner). The Examiner refers to "pointers" for objects allocated by system code (see Office Action at bottom of page 8), but this does not anticipate using a different promotion policy for such objects. For these additional reasons, claim 15 is believed in allowable over Kolodner.

Independent claim 29 is directed to a computer readable storage medium with limitation similar to those found in claim 1, and it is believed allowable for the reasons provided for allowing claim 1 over Kolodner.

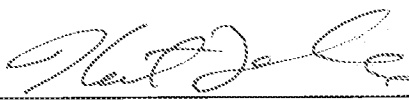
Conclusion

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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Date: 9/07/10

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